



Environment Research
Funders' Forum

Identification of future uncertainties and priorities for environmental research in the UK

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www.erff.org.uk



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‘Maximise the coherence and effectiveness of UK environmental research funding’





ERFF Objectives

- to provide a joined-up approach to UK environmental research strategy
- to determine areas of synergy where joint activities would add value
- to identify and consider taking action on any gaps in environmental research
- to shape UK and international future science direction



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Identification of priorities - many methods

- SWOT analysis 2003
- Shared priorities for the Government's Comprehensive Spending Review
- Strategic Reviews of environmental research, monitoring and skills needs
- Sharing emerging priorities
- Joint horizon scanning activity



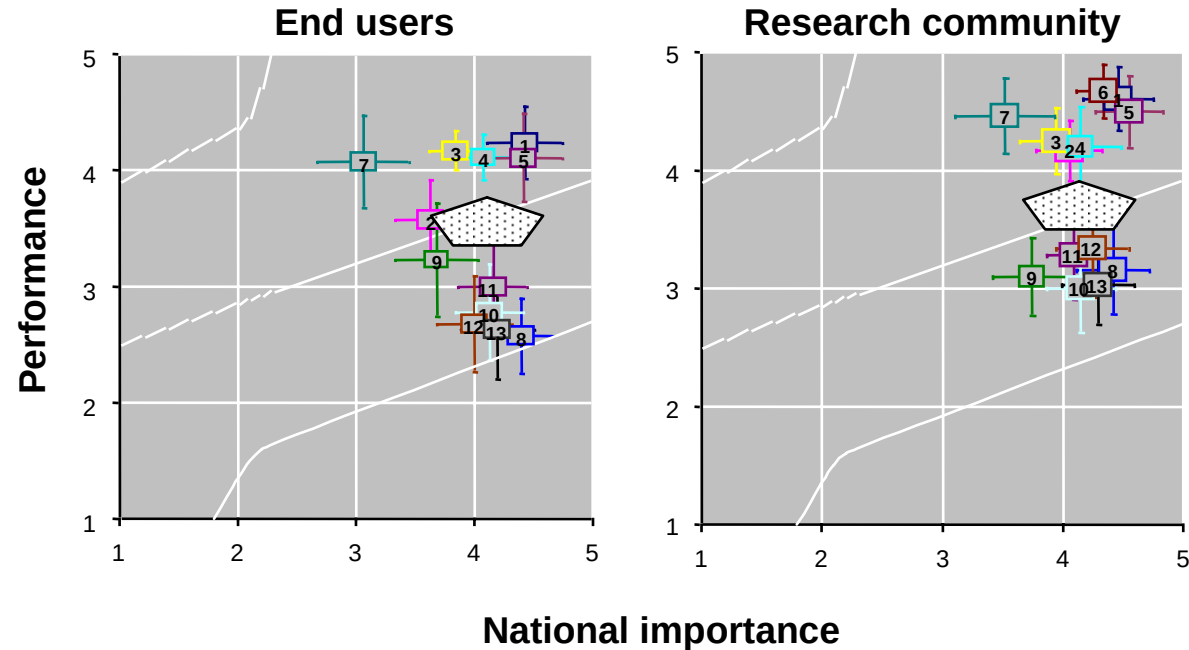
What are the strengths and weaknesses of UK environmental science?

- 1) Performing well

- Atmospheric science (1)
- Biogeochemistry (2)
- Earth sciences (3)
- Ecology & conservation biology (4)
- Global climate change (5)
- Oceanography (6)
- Polar analysis (7)

- 2) Room for improvement

- Environmental sustainability (8)
- Enviro-informatics (9)
- Human health & environment (10)
- Marine management (11)
- Society & environment (12)
- Waste management (13)



- End users (industry, NGOs, policy makers & regulators) consistently rated UK performance *slightly* lower than did the research community (researchers and funders)
- Findings showed broad agreement with:
 - Traditional science areas scoring positively
 - Subjects with 'room for improvement' dominated by issue led science areas and cross-disciplinary work (e.g. human health & environment)



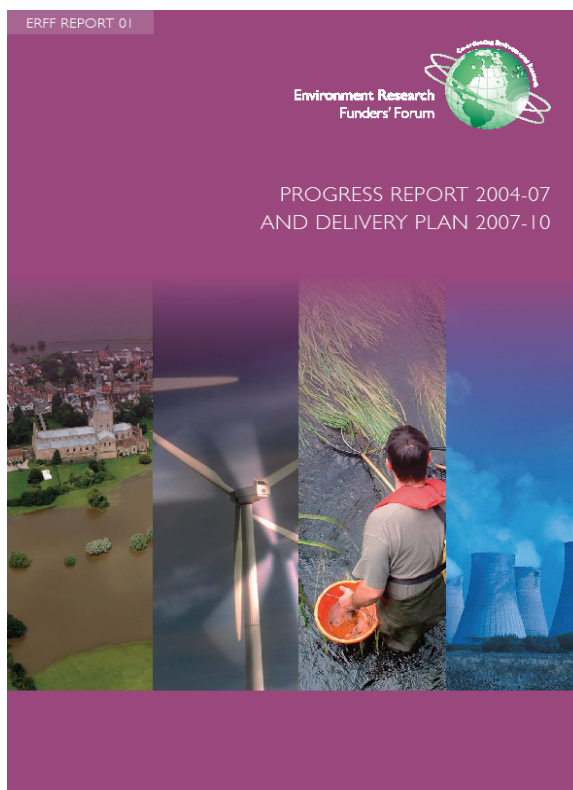
Summary of SWOT analysis 2003

Strengths		Weaknesses	
Science areas -Atmospheric sciences -Biogeochemistry -Earth sciences -Ecology & conservation biology -Global climate change -Oceanography -Polar analysis Infrastructure -Research vessels	Outputs -Good record in publications and citations across a range of subjects -Second to US in most subjects -Gap with US is narrowing -High level of publications and citations per GDP Training -CASE studentships -Joint Research Council studentships	Science Areas -Environmental sustainability -Enviro-informatics -Human health & environment -Marine management -Waste management Infrastructure -Environmental and pollution data sets -Environmental sample libraries	Outputs -Poor record in patents compared to similar countries -Exploitation of research is viewed as weak by users Training -‘Environmental science’ graduates less quantitative than ‘traditional’ scientists -Content of ‘environmental science’ degrees is not well specified
Opportunities		Threats	
Science areas/environmental issues -Biodiversity -Climate change -Energy -Human Health & the environment -Resource management -Sustainability -Water management -Urban Environment	Cross-cutting methodologies -Earth systems science -Monitoring and modelling -Society & environment	Organisation & funding -Bureaucracy -Insufficient integration across Research Councils -Difficulty of integrating with economic and social aspects -Negative effects of RAE -Insufficient support for long-term data sets	Communication & user needs -Research becomes under-valued valued by future policy makers and politicians Research as a career -Ageing population of researchers with declining dynamism -Career prospects for researchers are poor



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Delivery plan 2007-2010





Comprehensive Spending Review 2007

Underpinning document for Treasury making the case for environmental research

Shared priority based around delivering Treasury Challenge 5 – sustainable use of natural resources and living with the impacts of climate change agreed



- building effective mitigation, adaptation and resilience to climate change, including preparedness for changes to the intensity and frequency of extreme events,
- water availability, quality, use and management,
- environmental change and human health/well-being,
- biodiversity loss and effective conservation strategies,
- changes in land use and agriculture, including crop yields for sustainable food production,
- the distribution, spread and management of human, plant and animal diseases,
- sustain ecosystem management to help alleviate poverty,
- shifts in consumption and production patterns to decrease or alleviate pressures on ecosystem services,
- air quality in cities and rural areas to improve health in the UK and in developing areas of the world,
- changes to the built environment and to planning systems to respond to climate change,
- interactions of transport, leisure and tourism with the environment
- waste management,
- methods for integrated assessment incorporating the economic, social and environmental values of ecosystem services,
- urban centres, peri-urban, changing behaviours and collective action in the face of environmental change and its associated uncertainties.

How will this be done?
The Living With Environmental Change partnership will design a set of common strategic objectives and build and implement a research strategy based on the policy needs of each of the countries of the UK and their world-leading strengths in both research and policy development.

LWEC's strategy will acknowledge the need for dialogue and engagement with a full range of national and international stakeholders, including business, government, NGOs and wider publics, at all stages of the research process. With enhanced research capacity and the national skills base in key areas, Strong Knowledge Exchange activities will ensure LWEC's impact on policy and practice and help illustrate how people's views can be taken into account in the management of environmental resources. It will also seek to show how they might adapt their behaviours through use of tools, such as incentives and modern forms of regulation, and develop innovative approaches to managing the environment they are responsible for.

Who is involved so far?
The UK's main funders of environmental research have joined forces, through the Environment Research Funders' Forum, to develop and implement the *Living With Environmental Change* programme in an international context.

Research Councils UK
Natural Environment Research Council
Economic and Social Research Council
Engineering and Physical Sciences Research Council
Biotechnology and Biological Sciences Research Council
Medical Research Council
Arts and Humanities Research Council

Departments of State, Governments, and Agencies
Department for Environment, Food and Rural Affairs
Department for International Development
Department for Communities and Local Government
Department for Transport
Environment Agency
Welsh Assembly Government
Scottish Government
Natural England
Scottish Environment Protection Agency

Timing and Opportunities for Research
The LWEC Partnership will run for ten years from 2007. Preliminary opportunities, which have been developed with policy partners, have been announced, see NERC, ESRC and EPSRC websites for information.

www.nerc.ac.uk/funding/available/postgrad/documents/2007esrc-guide.pdf
www.epsrc.ac.uk/CMS/Web/Downloads/Calls/ClimateChangeCall07.doc
www.nerc.ac.uk/research/programmes/espa
www.nerc.ac.uk/research/programmes/twec

LWEC will be co-designed with the Research Councils' Energy Programme, with which there are strong complementarities and co-dependencies.
Produced on behalf of the LWEC Partnership.

Picture of windfarm copyright Gill Pictures.
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INTRODUCTION FOR STAKEHOLDERS



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Strategic Analysis of Environmental Research Activity





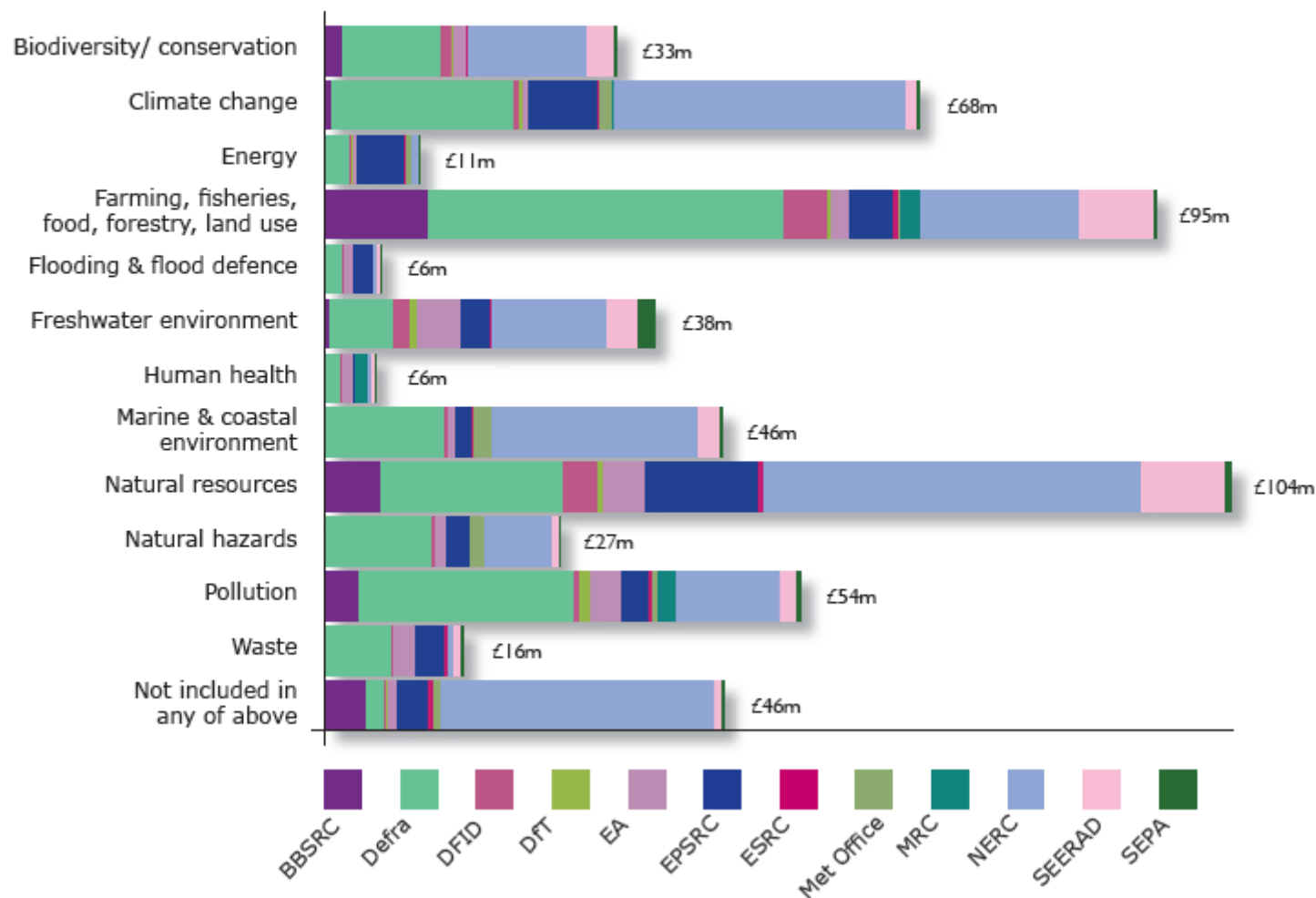
Spend on environmental research and training 2004-05

	Research	Training	Total
BBSRC	£20.7m	£1.4m	£22.1m
DEFRA	£68.3m	<£0.1m	£68.3m
DFID	£7.2m	£0.0m	£7.2m
DfT	£2.4m	£0.0m	£2.4m
EA	£10.3m	£0.1m	£10.4m
EPSRC	£21.2m	£0.1m ¹	£21.3m
ESRC	£1.9m	£0.3m	£2.2m
Met Office	£3.7m	£0.0m	£3.7m
MRC	£3.1m	£0.0m	£3.1m
NERC	£109.3m	£21.1m	£130.4m
SEERAD	£13.3m	£0.0m	£13.3m
SNIFFER for SEPA	£2.4m	£0.0m	£2.4m
Total	£263.8m	£23.0m	£286.8m

¹ Excludes EPSRC doctoral training grants



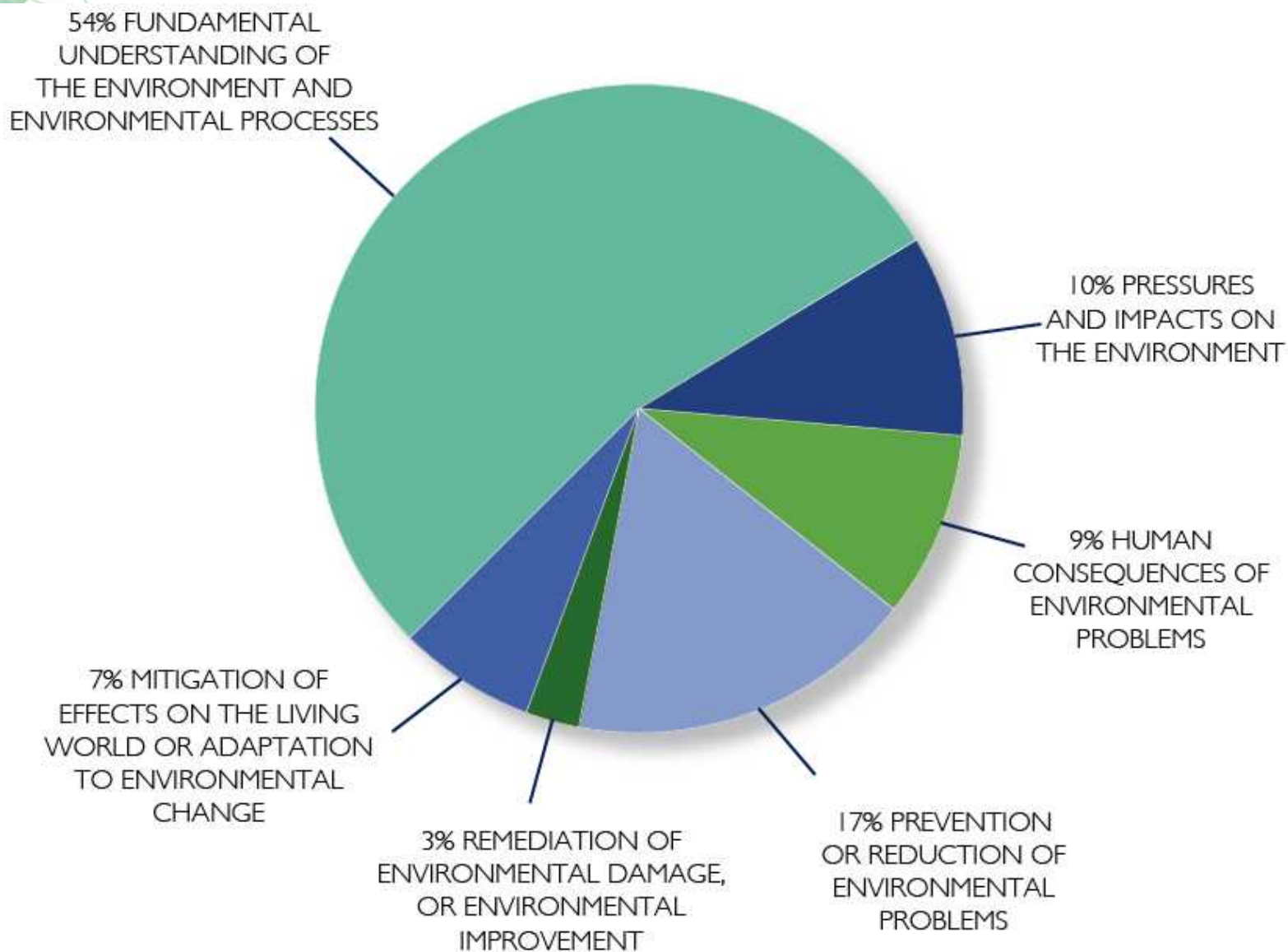
Research spend by priority area





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Research spend on understanding the environment, on problems and on solutions





Emerging priorities whiteboard

Priority science area	Identified by	Driver(s)	Opportunities	Research requirement	Coordination requirement	Policy formulation/ implementation required
Aviation	DfT	Increasing passenger numbers leading to higher greenhouse gas emissions as well as air pollutant and noise levels				
Impacts of diet and environment on human health	SEERAD	Policy and regulatory. Possible increasing emphasis on looking for health improvement benefits of the environment		To inform how the food we eat and the way it is produced and consumed affects human health		
Relevant initiatives	Current lead	Contact	Link to more information	Potential partners	Work undertaken to date	Training proposed
Support for Aviation to join the EU Emissions Trading Scheme	roger.gardner@dtf.gsi.gov.uk	http://www.rmd.dft.gov.uk/programme.asp?intProgrammeID=66	DEFRA, DTI		None.	DfT
		Dr Linda Pooley, Linda.Pooley@scotland.gsi.gov.uk	http://www.scotland.gov.uk/library5/environment/srs10-00.asp	RCs, EA and SEPA, SNH, SNIFFER		



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ERFF review of environmental monitoring





Horizon Scanning Study

Objectives

1. To identify the most important dimensions of uncertainty that could impact on the UK's interests over the next twenty years
2. To frame a shared understanding of the future environment for ERFF members
3. To help ERFF members identify shared priorities
4. To inform individual members' own strategies



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The process

What might
the future
be like...?

Interviews

Workshops

How will
environmental
changes
affect the
UK?

**Long list of
dimensions**

Fountain
Park
assessment

**Short list of
dimensions**

**ERFF Board
Workshop**

Implications
for individual
and collective
activities



Some overarching messages

- Environmental research in the future needs to anticipate what will happen, not characterise what has happened
- The environment cannot be looked at in isolation from social and economic developments
- The UK's actions cannot be looked at in isolation from the rest of the world - we must act together
- Policy making requires new approaches to take account of the complexity and uncertainty surrounding environmental issues
- There is a need for strong leadership



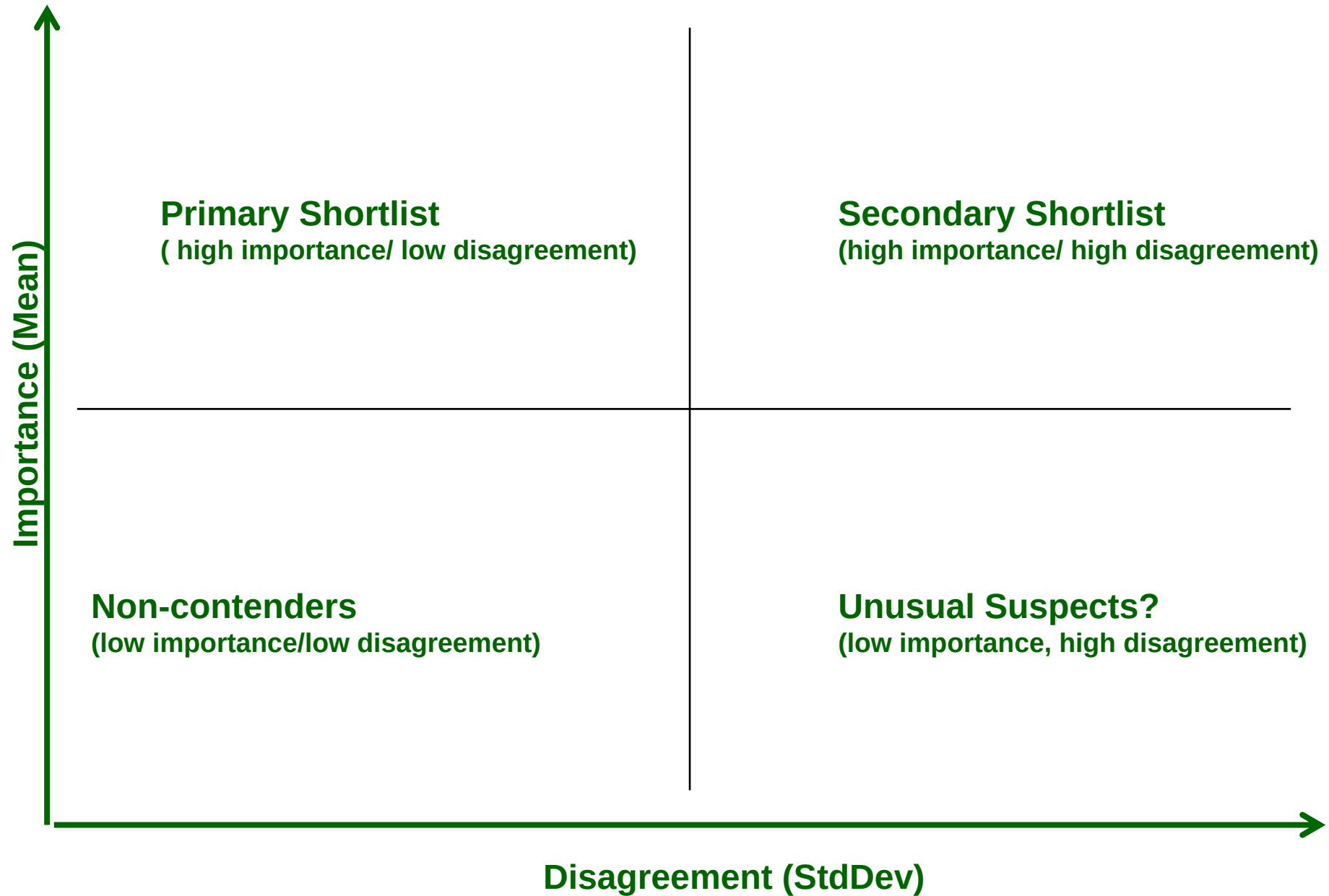
Dimensions of uncertainty

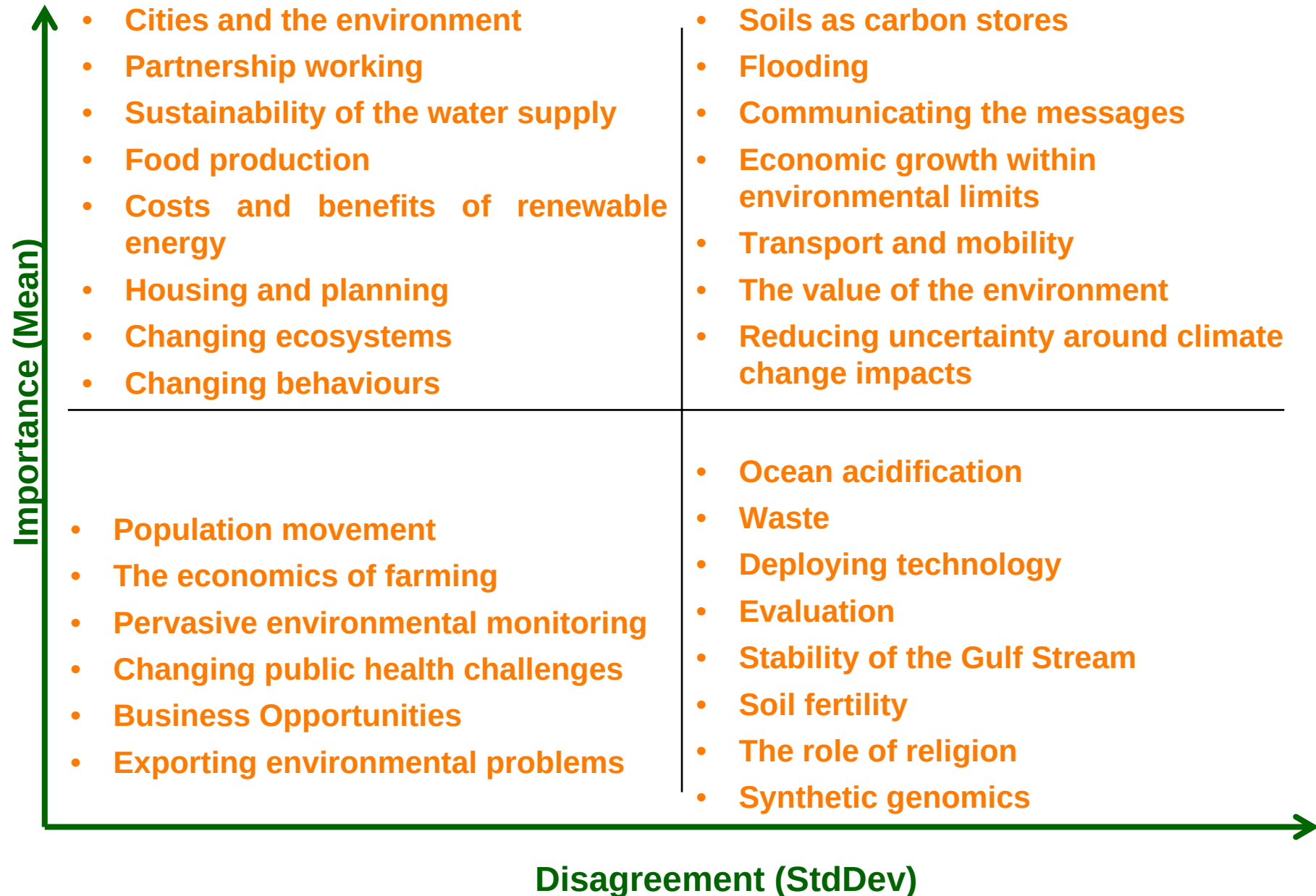
- A broad theme
- ...which a number of respondents have suggested is strategically important to the UK and to the environment
- ...but which is developing in an unclear way
- ...or is approaching some form of tipping point
- ...or about which we simply don't know enough
- ...and which therefore needs to be looked at in more detail



Fountain Park Exercise

- 29 Dimensions
- Participants invited to rank them according to importance to the UK's interest over the next 20 years
- 80 participants in total
 - 44 from ERFF members
 - 36 others
- Some new ideas added







The shortlist

- Cities and the environment (to include **Housing and planning**)
- Economic growth within environmental limits (can include **Valuing the environment**)
- Costs and benefits of renewable energy
- Food Production (can include **Soil fertility**)
- Sustainability of the water supply
- Changing behaviours (can include **Partnership working and communicating the messages**)
- Changing ecosystems (to include **Oceans and Soils**)
- Reducing uncertainty around climate change impacts
- Transport and mobility
- Deploying technology
- Consequences of population movement



Further consideration...

- Is the description of this dimension comprehensive – or are there additional issues that need to be considered?
- What sudden events or shocks could impact on these dimensions in the future? Over what timescale?
- What are the new high level research questions that emerge from this Dimension – and what pieces of research should be done?
- Who should be involved in taking this research forward?
- What should ERFF's role be and how can it add value?



High level outcomes

- ☺ **An agreed shortlist**
- ☺ **A strong sense of ownership**
- ☺ **Refined hypotheses**
- ☺ **Some clear ideas about things that need to be considered now**
- ☹ **...but some questions about the level of expertise involved in the discussions**
- ☺ **A strong sense of how ERFF can add value in the future**
- ☹ **...but some questions over the practicalities of that?**



Next steps?

- ☺ **Take on the mantle of leader, facilitator, co-ordinator**
- ☺ **Use the dimensions as the context for more detailed scanning**
- ☺ **Identify what knowledge exists and where the gaps lie**
- ☺ **Involve experts**
 - ☺ **Themed workshops?**
 - ☺ **Research programmes?**
 - ☺ **State of science reviews?**
- ☺ **Continue to monitor developments in the dimensions**



Next steps

- ☺ **Priorities identified were used in developing LWEC strategic objectives and to be considered by individual organisations e.g. Defra management team, SEPA strategy development.**
- ☺ **Members to report back by March 2008**
- ☺ **Main board to consider next steps- coordinate joint activities where relevant**



Skill needs review

- **The overall aim of the study is to guide strategically future training in Environmental Science by NERC and other organisations**
 - **by looking at current and future skill needs in the Environmental Science Sector**
- **Phase I: review of existing literature and interviews with key stakeholders**
- **Phase II: obtain a representative view of the Environmental Science Sector's skill needs**